

APPLICATION FOR PATENT

of

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SHELF

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1 BACKGROUND

2 The present invention relates to shelving and shelving systems. Shelving has
3 been used for centuries in a variety of different applications. Current shelves attach
4 in a number of ways to form shelving systems. In addition, shelves are and have
5 been made from a variety of materials with a variety of techniques. However, no
6 one has ever made a shelf in accordance with the present invention.

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8 BRIEF SUMMARY OF THE INVENTION

9 One aspect of the present invention relates to a shelf for attaching to one or
10 more upright members, wherein each upright member has one or more upwardly
11 oriented mounting members. The shelf is comprised of a top surface and a bottom
12 surface, the top surface being generally rectangular and generally planar and having
13 a front side, a back side, a left side and a right side. The top surface is formed from a
14 unitary sheet of metal. A front lip extends downward from the front side of the top
15 surface, is integrally connected to the top surface, and is formed from the unitary
16 sheet of metal. A back lip extends downward from the back side of the top surface,
17 is integrally connected to the top surface, and is formed from the unitary sheet of
18 metal. A left lip extends downward from the left side of the top surface, and the left
19 lip is integrally connected to the top surface and formed from the unitary sheet of
20 metal. The left lip includes two or more pairs of openings dimensioned to receive
21 mounting members, and each opening in a pair is aligned vertically. A right lip
22 extends downward from the right side of the top surface, and the right lip is integrally
23 connected to the top surface and formed from the unitary sheet of metal. The right
24 lip includes two or more pairs of openings dimensioned to receive mounting
25 members, and each opening in a pair is aligned vertically.

26 Another aspect of the invention relates to a shelf for attaching to one or more
27 upright members, wherein each upright member has one or more upwardly oriented
28 mounting tabs. The shelf is comprised of a generally planar top surface formed from
29 a unitary sheet of metal. The top surface defines a shelf space upon which articles
30 may be placed. A side surface extends downward and generally normal to the

1 planar top surface. The side surface is integrally connected to the top surface. A
2 bottom surface extends inward and generally normal to the side surface. The side
3 surface and the bottom surface are formed from the unitary sheet of metal. The
4 shelf is further comprised of a pair of slots dimensioned to receive an upwardly
5 oriented mounting tab of an upright member. Each slot in the pair is vertically
6 aligned with the other slot in the pair. The pair is comprised of a top opening in the
7 top surface and a bottom opening in the bottom surface. The slots extend at least in
8 part on the side surface.

9 Yet another aspect of the invention relates to a shelf for attaching to one or
10 more upright members, wherein each upright member has one or more upwardly
11 oriented mounting members. The shelf is comprised of a generally planar top
12 surface formed from a unitary sheet of metal. The top surface is comprised of two or
13 more sides adapted to be installed adjacent an upright member. At least two lips
14 extend from and are integrally connected to the top surface. Each of the lips is
15 comprised of a lip side surface extending downward and generally normal to the
16 planar top surface. A lip bottom surface extends inward and generally normal to the
17 lip side surface. The lip side surface and the lip bottom surface are formed from the
18 unitary sheet of metal. The shelf is further comprised of an opening dimensioned to
19 receive an upwardly oriented mounting member of an upright member. The opening
20 is positioned in the bottom lip surface. The shelf is further comprised of one or more
21 strengthening members. Each strengthening member extends substantially between
22 the two lips.

23 The foregoing brief description should not be used to limit the scope of the
24 present invention. Other examples, features, aspects, embodiments, and
25 advantages of the invention will become apparent to those skilled in the art from the
26 following description, which is by way of illustration, one of the best modes
27 contemplated for carrying out the invention. As will be realized, the invention is
28 capable of other different and obvious aspects, all without departing from the
29 invention. Accordingly, the drawings and descriptions should be regarded as
30 illustrative in nature and not restrictive.

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BRIEF DESCRIPTION OF DRAWINGS

While the specification concludes with claims which particularly point out and distinctly claim the invention, it is believed the present invention will be better understood from the following description taken in conjunction with the accompanying drawings, in which like reference numerals identify the same elements. The drawing and detailed description which follow are intended to be merely illustrative and are not intended to limit the scope of the invention as set forth in the appended claims.

Fig. 1 depicts a perspective view of a shelf system;

Fig. 2 depicts a perspective view of a shelf and an upright member;

Fig. 3 depicts a perspective view of the shelf of Fig. 2 mounted to the upright member of Fig. 2;

Fig. 4 depicts a partial cross-sectional side view of a shelf;

Fig. 5 depicts a top view of a shelf prior to forming.

DETAILED DESCRIPTION

Fig.1 illustrates a shelf system (2). The shelf system (2) of the present example comprises two shelves (6), four upright members (4), horizontal supports (16), and a cross-support (10). While Fig. 1 shows four upright members (4), the number and positions of the upright members (4) may be varied based on a variety of factors and preferences known to those skilled in the art.

The shelf (6) in the present example includes a planar top surface (12) having a rectangular surface area and front (13), back (23), left (17), and right (35) sides. It will be appreciated that the top surface (12) need not be rectangular. For example, a shelf (6) may be a variety of polygons, including a square, triangle, parallelogram, trapezoid, and the like. In addition to polygons, one or more sides of a shelf (6) may be non-linear, such as convex or concave curves, radii, ellipses, parabolas, and the like. As shown, the top surface (12) has two sides (17, 35) adapted to be installed adjacent to an upright member (4).

In the present example, a front lip (14) extends downward from the front side (13) of the top surface (12), and is integrally connected therewith. A back lip (24)

1 extends downward from the back side (23) of the top surface (12), and is integrally
2 connected therewith. A left lip (18) and right lip (36) are integrally connected to the
3 top surface (12), and extend downward from the left side (17) and right side (35) of
4 the top surface (12), respectively. The front lip (14), back lip (24), left lip (18), and
5 right lip (36) each comprise a lip side surface (38) extending downward and
6 generally normal to the planar top surface (12) and a lip bottom surface (26)
7 extending inward and generally normal to the respective lip.

8 As shown here, the front lip (14) extends perpendicularly downward from the
9 front side of the top surface (12). The back lip (24), left lip (18), and/or right lip (36)
10 may extend similarly or differently. For instance, the front lip (14), back lip (24), left
11 lip (18), and/or right lip (36) may extend diagonally downward, curved downward, or
12 in any other downward fashion from the top surface (12). In addition, neither the
13 front lip (14), back lip (24), left lip (18), nor right lip (36) need be substantially planar.
14 The front lip (14), back lip (24), left lip (18), and/or right lip (36) may extend
15 downward for any desired distance, such as, by way of example only, $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1", or
16 any other distance. The height of all of the lips (14, 18, 24, 36) may be made
17 uniform. It is contemplated, however, that a shelf (6) may also be constructed such
18 that the height of one or more lips is different than that of the other lips.

19 As shown in Fig. 1, the shelf (6) in the present example mounts and attaches
20 to upright members (4) of a shelf system (2) at upwardly oriented mounting members
21 (8). In the present example, the mounting members (8) take the form of tabs. Such
22 tabs extend outward and upward from their respective upright member (4). Such
23 tabs are oriented vertically, are flat, and have a rounded end. It will be appreciated
24 by those of ordinary skill in the art that tabs may be configured in many other
25 possible ways as mounting members (8). It will be further appreciated that there are
26 many mounting member (8) alternatives to tabs, such as, by way of example only,
27 lances and prongs and the like, and the shelf (6) may mount to a variety of types of
28 different mounting member (8) configurations. By way of example only, a shelf (6)
29 may also mount to mounting members (8) that are horizontally oriented. In other
30 words, openings (20) in a shelf (6) may receive mounting members (8) that are
31 oriented generally parallel to the top surface (12).

1 Fig. 1 shows upright members (4) having a plurality of mounting members (8)
2 spaced apart equidistantly. However, it will be understood that the mounting
3 members (8) may be arranged in a variety of other configurations. For example, the
4 arrangement of mounting members (8) may differ on each upright member (4),
5 and/or the mounting members (8) may be arranged such that they are not spaced
6 apart equidistantly.

7 As shown here, the shelf (6) engages mounting members (8) at the left lip
8 (18) and the right lip (36). Figs. 2 and 3 illustrate a method of mounting a shelf (6) to
9 a mounting member (8) on an upright member (4). As shown here, the left lip (18) of
10 a shelf (6) has two pairs of openings (20A, 20B) dimensioned to receive mounting
11 members (8). It is contemplated, however, that more than two pairs of openings
12 (20A, 20B) may be used. Further, instead of a pair of openings (20A, 20B), only a
13 single opening (20A or 20B) may be used. The openings (20A, 20B) shown are
14 aligned vertically, and each opening (20A or 20B) in a pair is the same size as the
15 other opening (20B or 20A) in the pair. Alternatively, one opening (20A or 20B) in a
16 pair may be made larger or smaller than the other opening (20B or 20A) in the pair.

17 As shown, the openings (20A) that are closest to the top surface (12) extend
18 at least in part into the top surface (12). Alternatively, where a shelf (6) is made with
19 at least one lip bottom surface (26), a shelf (6) may have openings (20B) only in the
20 lip bottom surface (26). In other words, a shelf (6) may be made without having any
21 openings (20A) in the top surface (12) and/or lip side surface (38). As further shown,
22 both openings (20A, 20B) in a pair extend at least into part into the lip side surface
23 (38). However, it is contemplated that a shelf (6) may be made without at least one
24 opening (20A and/or 20B) extending into the lip side surface (38).

25 By way of example only, each opening (20A, 20B) is shown in the form of a
26 slot. The right lip (36) is configured similarly to the configuration of the left lip (18)
27 described above. Alternatively, the right lip (36) may be configured differently from
28 the left lip (18).

29 The top surface (12), front lip (14), back lip (24), left lip (18), and right lip (36)
30 may all be formed from a unitary sheet of metal. For the purposes of this
31 specification and claims, "unitary sheet of metal" means that two or more

1 components share a homogeneous continuum of the same metal. The metal may
2 be, by way of example only, formed from a sheet of aluminum, stainless steel,
3 galvanized steel, powder coated steel, or any other suitable material. The metal may
4 be of any thickness, but preferably between 32 and 12 gauge, more preferably
5 between 24 and 18 gauge, and most preferably about 22 gauge. As illustrated here,
6 the shelf (6) is devoid of any welds.

7 The shelf (6) shown in Fig. 4 further comprises optional strengthening
8 members (22). While Fig. 4 shows two strengthening members (22), it is
9 contemplated that any number of strengthening members (22) may be used. Fig. 4
10 shows each strengthening member (22) attached to the bottom surface (28) of the
11 shelf (6). The strengthening members (22) may be attached to a surface using a
12 variety of techniques known in the art, including welding, screws, bolts, an adhesive,
13 rivets, TOX® joining by TOX® PRESSOTECHNIK GmbH & Co. KG, and the like.

14 Fig. 4 shows a strengthening member (22) comprised of two flanges (32) and
15 a rib (34) positioned between the two flanges (32). The flanges (32) and rib (34)
16 may be formed from a unitary sheet of metal. Alternatively, any other construction
17 and/or configuration may be used for one or more strengthening members (22).
18 Strengthening members (22) may be comprised of hat channels. Fig. 4 shows the
19 strengthening members (22) positioned such that the strengthening members (22)
20 are parallel to the front side of the top surface (12). One or more optional
21 strengthening members (22) may extend substantially the full length of top surface
22 (12). Alternatively, one or more strengthening members (22) may be positioned or
23 sized in any other suitable way.

24 Fig. 5 depicts a pre-bent sheet (30) that may be formed into a shelf (6), where
25 the dotted lines represent lines along which the pre-bent sheet (30) may be bent or
26 folded to form the shelf (6). The geometry of the pre-bent sheet (30) may be cut
27 from a sheet of metal by stamping, laser cutting, or any other suitable method known
28 in the art. The openings (20A, 20B) are cut in the pre-bent sheet (30) such that one
29 opening (20B) in each pair of openings (20A, 20B) will be positioned at least in part
30 into the respective lip bottom surface (26) and the other opening (20A) in the pair will
31 be positioned at least in part into the respective top surface (12). Both openings

1 (20A, 20B) are cut in the pre-bent sheet (30) such that both openings (20A, 20B) will
2 extend at least in part into the lip side surface of the respective lip (18, 36).

3 As will be apparent to those of ordinary skill in the art, it is possible that, in
4 forming a lip bottom surface (26) on the front lip (14), back lip (24), left lip (18),
5 and/or right lip (36), there may be a tendency for the ends of adjacent lip bottom
6 surfaces (26) to overlap. Fig. 4 shows the lip bottom surface (26) of the front lip (14)
7 and the lip bottom surface (26) of the back lip (24) bent to overlap the lip bottom
8 surface (26) of the right lip (36). The same is shown as to the lip bottom surface (26)
9 of the left lip (18). Alternatively, at least one lip bottom surface (26) may overlap in
10 any other configuration. A shelf (6) may also be constructed such that no lip bottom
11 surfaces (26) overlap at all.

12 Having shown and described various embodiments of the present invention,
13 further adaptations of the methods and systems described herein can be
14 accomplished by appropriate modifications by one of ordinary skill in the art without
15 departing from the scope of the present invention. Several of such potential
16 alternatives, modifications, and variations have been mentioned, and others will be
17 apparent to those skilled in the art in light of the foregoing teachings. Accordingly,
18 the invention is intended to embrace all such alternatives, modifications and
19 variations as may fall within the spirit and scope of the appended claims and is
20 understood not to be limited to the details of structure and operation shown and
21 described in the specification and drawings.